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## THE COAL SUPPLIES AND COAL PRODUCTION OF THE UNITED STATES.\*

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The coal fields of the United States are scattered over thirty States and the Territory of Alaska. The total areas of the known coal fields aggregate 310,000 square miles. In addition to these known areas there are about 160,000 square miles which may contain workable coal, and about 32,000 square miles where coal probably exists, but is under cover so heavy that it may be considered unavailable as a present resource.

The estimates on which these figures are based have been made by geologists of the Federal Survey and are regarded as moderate. In fact, I have been informed that the later investigations of the coal fields of the Rocky Mountain region indicate that the area of those coal fields has been underestimated, so that the total of 500,000 square miles which we have been accustomed to consider the possible limit of our prospective coal-producing territory may be exceeded. With the exception of an insignificant amount produced in Colorado and New Mexico, all the anthracite mined in the United States is taken from a small area in the eastern half of Pennsylvania. The Pennsylvania anthracite region contains less than 500 square miles, and yet it had produced by the close of 1910 nearly 2,200,000,000 short tons of coal, or a little more than one fourth of the total coal output of the United States.

For convenience the bituminous coal areas of the United States have been divided into six main provinces: the Eastern, Interior, Great Plains, Rocky Mountain, Pacific Coast, and Gulf provinces. The Eastern Province includes all the bituminous areas of the Appalachian region and two outlying areas in Virginia and North Carolina. It contains 69,332

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square miles, and is by far the most productive of the coal fields. In 1910 it produced approximately 57 per cent. of the total output, and it has produced nearly one half of the entire coal output of the United States since mining began. The aggregate production of anthracite in Pennsylvania and of bituminous coal in the Appalachian region constitutes 75 per cent. of the total production of coal in the United States.

The anthracite region of Pennsylvania is estimated to have contained when mining began 21,000,000,000 short tons of coal, and the Appalachian region to have contained over 542,000,000,000 tons of bituminous coal. Twenty per cent. of the anthracite supply has been exhausted. The drain upon the bituminous areas of the Appalachian region has consumed about 1.2 per cent. of the original supply.

The Interior Province contains the coal areas in the Mississippi Valley and the somewhat isolated Michigan field, which lies in the drainage area of the Great Lakes. The Interior Province is considerably larger in area than the Appalachian, having a total of 113,744 square miles, but it will probably be many years before it reaches the productive importance shown by the Appalachian region at the present time. In 1910 it produced 96,500,000 short tons, or more than 18 per cent. of the total output of the country. From the earliest times to the close of 1910 this province has produced nearly 20 per cent. of this total.

The Rocky Mountain and Great Plains provinces possess enormous potentialities as coal-producing regions. The known coal areas embrace nearly 125,000 square miles, and these provinces also include most of the 160,000 square miles of little known regions which may contain workable coal, and the 32,000 square miles of coal under heavy cover. When all is known we shall probably find that these areas include over 300,000 square miles of coal-productive territory. The content of the present known fields is nearly 2,000,000,000,000 short tons, from which to the close of 1910 less than 350,000,000 tons had been withdrawn. The production in 1910 was 28,857,000 short tons, or a little over 5.5 per cent. of the total for the United States.

The Pacific Coast fields are comparatively small. Exclusive of those in Alaska, they have an aggregate area of about 1,830 square miles, and they are estimated to have contained, when mining began, 22,000,000,000 tons, or about the same as the anthracite region of Pennsylvania. The anthracite region, however, has produced over 2,000,000,000 tons, whereas the Pacific Coast States have produced only a little over 60,000,000 tons. Their production in 1910 was 3,992,000 short tons, nearly all of which was mined in the State of Washington.

The Gulf Province, which includes the lignite areas of Texas, Louisiana, southern Arkansas, Mississippi, and Alabama, is not now of much economic importance, although the production of lignite in Texas amounts to nearly 1,000,000 tons annually. As in the Rocky Mountain Province, these areas possess great possibilities for the future.

In the quality of its coals as well as in its present production, the Appalachian region is the most important. In that area are found the highest-grade coking, steaming, black-smithing, gas, and domestic bituminous coals mined in the United States. Coking coals are found all the way from Pennsylvania to Alabama, and most of them occur along the eastern border.

The coals of the Interior Province are principally dry, non-coking coals, but make excellent steam and domestic fuels.

In the Great Plains region, particularly in North Dakota and South Dakota, as they approach the mountains, the coals grade from lignitic to subbituminous, or black lignite, and in the mountainous areas become true bituminous coals, some of which make excellent coke. The region also contains some anthracite. The principal coking operations in this region at present are in the Raton-Trinidad field, in the southeastern part of Colorado and the northeastern part of New Mexico. Coking coals are also found in Utah, Montana and Wyoming. Some of the coals in Washington make coke, and some natural coke has been found in that State.

The Royal Commission on the Coal Supplies of Great Britain estimated the reserves of that country at approxi-

mately 160,000,000,000 long tons, or say 180,000,000,000 short tons. In Continental Europe the supplies are as follows:

Germany.....	145,400,000,000 tons
Austria.....	17,000,000,000 tons
France.....	17,000,000,000 tons
Belgium.....	16,000,000,000 tons
Russia.....	20,000,000,000 tons

The known supplies of Canada are about 100,000,000,000 tons, and the supplies of the United States, including Alaska, are placed at 3,200,000,000,000 tons, or eight times that of all Europe.

The total production of coal in the United States to the close of 1910 has amounted to 8,243,350,000 tons. It has been estimated that for every ton of coal mined, one half a ton has been lost in the operation of mining. In the early days in the anthracite region (in fact, in all the coal-producing districts) this loss was much greater than it is at present. The total exhaustion has been estimated at about 13,400,000,000 short tons. The total exhaustion since mining began is less than one half of one per cent. of the original supply. The annual rate of exhaustion at the present time, as represented by the production of 1910, is 0.025 of one per cent. of the supply. The quantity of coal still in the ground at the close of 1910 was 6,000 times the production of that year, and if the loss in mining is estimated at half a ton for every ton mined, the supply is 4,000 times the exhaustion resulting from the tonnage extracted in 1910. This does not mean, however, that the supply will last 4,000 years. In fact, if the production continues to increase at the rate which has been maintained during the last fifty years, doubling practically every decade, very little arithmetic is necessary to show that the agitation regarding the conservation of our fuel supply has not been altogether without some ground.

A comparison of the increase in coal production with that of the growth of our population presents some interesting figures. In 1850, sixty years earlier than the latest year for which figures are available, the production of coal in the United States amounted to less than 6,445,681 tons. The

population in that year was 23,191,876 persons, and the production of coal per capita was 0.278 ton. Ten years later, in 1860, the population was 31,443,321 and the coal production amounted to 16,139,736 tons, or an average of 0.514 ton for each person. At the census of 1870 the population of the United States amounted to 38,558,371; the coal production of that year amounted to 36,806,560 short tons, a per capita average of 0.96 ton. Ten years later, in 1880, when the population was 50,189,209, the coal output amounted to 76,157,944 short tons, or 1.52 tons per capita. In 1890 the population had grown to 63,069,756, an increase of 25 per cent. over 1880, and the coal production had grown to 157,770,963 short tons, or a per capita production of 2.52 tons. At the taking of the Twelfth Census, in 1900, when the increase in population amounted to 22 per cent., the total number of persons reported being 76,303,387, more than 79 per cent. had been added to the coal production, with a total of 269,684,027 short tons, or an average of 3.53 tons for each inhabitant. In other words, while the population was increasing 230 per cent. from 1850 to 1900 the production of coal increased 4,084 per cent. The report of the Thirteenth Census on population shows that on April 15, 1910, the United States contained 91,972,266 persons. The coal production in that year was 501,500,000 short tons, indicating that the per capita coal production at the present time is about 5.5 short tons.

It is true that in the earlier years covered by this summary the proportion of wood used for fuel was larger than it is at the present time, but the actual consumption of wood for fuel today is probably as great as, or possibly greater than, it was half a century ago. It should also be remembered that, in addition to the production of coal, there has been a great increase in the use of oil for fuel, and natural gas still remains an important fuel. The consumption of petroleum for fuel in 1910 was probably equivalent to between 20,000,000 and 25,000,000 short tons of coal, about four times our production of coal sixty years ago.

The great increase in coal mining, particularly within the last thirty years, has been in the production of bituminous

coal, although the production of anthracite has kept abreast with the increase in the population of the districts served by it.

The strike in the anthracite region in 1902 and the industrial depression in bituminous coal production in 1908 made striking exceptions to an almost steady growth. The anthracite industry of Pennsylvania is not subject to fluctuations caused by industrial conditions as is the bituminous coal trade. Twenty-five years ago considerable quantities of anthracite were used in iron furnaces and for making steam; but it is now used almost entirely for domestic fuel. Only the sizes below pea coal, which are not fit for domestic use are used as steam fuels, and the consumption even of these is limited practically to the heating of office buildings, hotels, apartment houses, etc. The quantity of anthracite now used in any branch of manufactures is insignificant.

Pennsylvania, with its combined production of anthracite and bituminous coal, is far in the lead. Until within the last few years Pennsylvania produced more than one half of total output of coal in the United States, and at the present time contributes 47 per cent. of the total output. On account of the higher price of anthracite, as compared with bituminous coal, the value of Pennsylvania's production is within a small fraction of 50 per cent. of the value of the total production in the United States. Pennsylvania's production of bituminous coal in 1910 was 150,000,000 tons, and that of anthracite, 84,500,000 tons, but the value of the anthracite exceeded that of the bituminous production by over \$7,000,000. West Virginia ranks second in total production, having supplanted Illinois in 1909. No better illustration of the unwisdom of the failure to utilize raw products at home can be shown than that presented by the comparison of West Virginia's production with that of Illinois. The bituminous coal fields of West Virginia contain some of the highest-grade steaming and coking coals in the United States, if not in the world, and yet, as will be seen, the average price for this product in 1910 was less than \$1 per ton. The coals of Illinois, on a strictly B. T. U. basis, rank probably 20 per cent. lower than the average West Virginia coal, yet the average price for the

Illinois product in 1910 was \$1.14 per ton, compared with 92 cents as the average price for West Virginia's production. Few realize that 80 per cent. of the value of the mineral production of West Virginia is represented by its fuel output, coal, petroleum, and natural gas, and fully 80 per cent. of all of these fuels of inestimable value is consumed outside the state. On the other hand, the production of Illinois is consumed principally in the manufacturing and transportation industries of that State, or in immediately adjacent territory. West Virginia, which ranks second in coal production, stands 34th among the states in the value of its manufactured products. Some of its valuable timber is shipped to Grand Rapids, Mich., and the manufactured furniture is shipped back into West Virginia. The transportation companies traversing West Virginia appear to be more interested in securing the heavy coal tonnage than in building up manufacturing industries in the State. Most of the coal consumption within West Virginia is by the locomotives carrying coal to the support of manufactures in other States. Agriculture seems to have been as much neglected as manufactures, for West Virginia imports from other States from \$30,000,000 to \$40,000,000 worth of agricultural products annually.

The value of the coal output of the United States is equal to nearly one third of that of the total mineral production of the country. In 1910 the total value of the mineral products of the United States was \$2,003,744,869. The value of the coal produced was \$629,557,021.

Next to coal in the value of the mineral products is pig iron, with a total value in 1910 of \$425,115,235. These two, iron and coal, make up more than half the total value of the mineral output. The third in importance are the clay-working industries, which in 1910 contributed \$170,115,974 to the total value. Copper comes fourth, with \$137,180,257, and petroleum fifth, with \$127,896,328. "The accursed thirst for gold" is responsible for less than 5 per cent. of the total value of our mineral production, the gold mines of this country yielding in 1910 a value of \$96,269,100.

The total coal production of the world at the present time



amounts to 1,280,000,000 tons, of which the United States contributes about 40 per cent. Prior to 1899 the United States stood second among the coal-producing countries of the world, Great Britain leading. In 1910 the United States produced 501,596,378 short tons of coal, and exceeded by more than 50 per cent. the tonnage of Great Britain and all of her colonies.

An interesting fact with regard to the world's production of coal is that 98 per cent. of the total output is from the northern hemisphere, the total quantity of coal produced in the countries lying south of the equator being between 20,000,000 and 25,000,000 tons annually.

*Men and machinery.*—The coal mines of the United States gave employment in 1910 to 725,030 men, of whom 169,497 were employed in the anthracite mines of Pennsylvania, and 555,533 were employed in the bituminous and lignite mines. The anthracite workers averaged 229 days during the year, and the bituminous and lignite averaged 217 days, the general average being 220 days. The average production per man in the anthracite mines was 498 short tons for the year and 2.17 tons for each working day, and in the bituminous and lignite mines the average production per man was 751 tons for the year and 3.46 tons for each working day. The statistics of labor employed in 1909, which were collected by the Bureau of the Census, were not compiled in a manner that furnishes comparisons with the statistics compiled by the Geological Survey.

In 1908 there were 690,438 men employed, 174,174 in the anthracite mines and 516,264 in the bituminous and lignite mines. In that year the average production per man in the anthracite region was 478 tons for the year and 2.39 tons per day, and in the bituminous and lignite mines these averages were, respectively, 644 tons and 3.34 tons.

It is doubtful if the great tonnage record made in the production of bituminous coal by the United States in recent years could have been attained with the supply of labor available and at the low prices which have obtained except for the introduction of labor-saving machinery. In this the greatest part has been played by the machines used for

undercutting and shearing the coal. In many cases the installation of machinery has been forced upon the operators in order to meet the constantly increasing competition combined with advances in wages, and yet it also happens that much of the advantage sought to be obtained has been lost through the differentials in mining rates placed against the machines. More important than the lessening of the mining cost, however, is the reduction of liability to accident by decreasing the proportion of coal "shot from the solid." This reprehensible practice of making the powder do the work, in addition to increasing the danger from explosions and fires, weakens the roof and pillars and produces an inordinate quantity of undesirable or unmarketable fuel. Every step taken to eradicate this evil is a step in advance.

The total quantity of bituminous coal and lignite mined by the use of machines in 1910 was 174,012,293 short tons, or 41.7 per cent. of the total. In 1909 the machine-mined production amounted to 142,496,878 short tons, or 37.5 per cent. of the total output of bituminous coal and lignite. (None of the anthracite product is undercut either by hand or machinery. It is all shot from the solid, and the character of the coal does not permit of any other method.) The quantity of machine-mined coal in 1910 exceeded that of 1909 by 31,515,415 short tons, or 22.1 per cent., whereas the total production of bituminous coal and lignite showed an increase in 1910 over 1909 of only 9.84 per cent. Over 80 per cent. of the total increase in 1910 was in machine-mined coal. The number of machines in use did not show as large an increase as the increase in machine-mined coal, but the statistics indicate a decided advance in the efficiency of the machines employed, and this in turn is to some extent responsible for the increase in the output per man previously mentioned. There were 13,254 machines in use in 1910 against 13,049 in 1909. The average production for each machine increased from 10,920 short tons in 1909 to 13,127 short tons in 1910.

*Washed coal.*—The production of anthracite in Pennsylvania includes a considerable quantity of coal recovered from the old culm banks by washers. The production of 1910 includes 3,296,318 long tons of fuel thus recovered, against

3,694,470 long tons of washery recovered coal in 1909. In addition to the washery product there were 91,833 long tons in 1910 and 96,239 long tons in 1909 recovered from the bottom of Susquehanna River by means of dredges. The washery product of 1910 was smaller than in any year since 1906, the decrease in this item being probably due to the gradual disappearance of the culm banks.

A considerable quantity of bituminous coal is washed each year, most of this being the slack coal used in the manufacture of coke. In Illinois, however, the larger part of the coal washed is nut coal and is sold to the domestic trade. The total quantity of bituminous coal washed in 1910 was 18,395,382 short tons, an increase of about 1,853,500 short tons over 1909. The washing process yielded in 1910, 16,035,387 tons of cleaned coal and 2,359,995 short tons of refuse. A little over one third of the total quantity of coal washed was Alabama coal used for coke making. One fourth of the total was Pennsylvania coal, and most of this was also used in coke making. In Illinois the quantity of coal washed (principally for domestic use) was 2,453,208 tons.

*Consumption.*—Practically the entire output of both anthracite and bituminous coal in the United States is consumed within the country. The effort on the part of some of the operators in the Eastern States to build up an export trade has resulted in a considerable expansion of business along this line of some importance in itself but of comparative insignificance when considered with the total production. The total quantity of coal exported in 1910 was 15,462,570 short tons, or a little over 3 per cent. of the production. The consumption of coal of domestic production—that is, the total production less the quantity exported—of 1910 was 486,133,808 short tons. The imports amounted in 1910 to 1,686,612 short tons, which, added to the consumption of domestic coal, made the total consumption in that year 487,820,420 short tons, which is equivalent to 97.25 per cent. of the domestic production. In this statement no account is taken of the stock on hand at the beginning and the end of the year. The coal-mining industry is at best of a hand-to-mouth character, and stocks do not figure in the trade.

COAL PRODUCTION OF THE UNITED STATES IN 1910, BY STATES AND TERRITORIES  
IN SHORT TONS.

State or Territory.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employees.
Alabama .....	16,111,462	\$20,236,853	\$1.26	249	22,230
Arkansas .....	1,905,958	2,979,213	1.56	138	5,568
California and Alaska .....	12,164	33,336	2.74	189	19
Colorado .....	11,973,736	17,026,934	1.42	236	15,864
Georgia .....	177,245	259,122	1.46	265	386
Idaho .....	4,448	17,426	3.92	200	14
Illinois .....	45,900,246	52,405,897	1.14	166	72,645
Indiana .....	18,389,815	20,813,659	1.13	229	21,878
Iowa .....	7,828,120	13,903,913	1.75	218	16,666
Kansas .....	4,921,451	7,914,709	1.61	148	12,870
Kentucky .....	14,623,319	14,405,887	.99	221	20,316
Maryland .....	5,217,125	5,835,058	1.12	270	5,809
Michigan .....	1,534,967	2,930,771	1.91	211	3,575
Missouri .....	2,982,433	5,328,285	1.79	154	9,691
Montana .....	2,920,970	5,319,322	1.82	239	3,837
New Mexico .....	3,508,321	4,877,151	1.39	283	3,585
North Dakota .....	399,041	595,139	1.49	207	534
Ohio .....	34,209,668	35,982,288	1.05	203	46,641
Oklahoma .....	2,646,226	5,867,947	2.22	144	8,657
Oregon .....	67,533	235,229	3.48	257	153
Pennsylvania, bituminous .....	150,521,526	153,029,510	1.02	238	175,403
Tennessee .....	7,121,380	7,925,350	1.11	225	11,930
Texas .....	1,892,176	3,160,965	1.67	234	4,197
Utah .....	2,517,809	4,224,556	1.68	200	3,053
Virginia .....	6,507,997	5,877,486	.90	241	7,264
Washington .....	3,911,899	9,764,465	2.50	256	6,314
West Virginia .....	61,071,019	56,665,061	.92	228	68,663
Wyoming .....	7,533,088	11,706,187	1.55	248	7,771
Total bituminous .....	417,111,142	\$469,281,719	\$1.12	217	555,533
Pennsylvania, anthracite .....	84,485,236	160,275,302	1.90	229	169,497
Grand total .....	501,596,378	\$629,557,021	\$1.25	220	725,030

BITUMINOUS COAL MINED BY MACHINES IN THE UNITED STATES IN 1910, BY STATES  
AND TERRITORIES.

State or Territory.	Number of machines in use.		Number of tons mined by machines.	
	1910		1910	
Alabama .....	317		2,980,122	
Arkansas .....	12		13,383	
Colorado .....	256		1,905,781	
Illinois .....	1,361		17,730,298	
Indiana .....	645		8,986,495	
Iowa .....	17		22,158	
Kansas .....	13		34,240	
Kentucky .....	899		9,362,851	
Maryland .....	38		137,216	
Michigan .....	100		698,191	
Missouri .....	96		553,656	
Montana .....	99		866,401	
New Mexico .....	3		71,609	
North Dakota .....	13		165,366	
Ohio .....	1,452		28,887,241	
Oklahoma (Indian Territory) .....	13		28,166	
Pennsylvania .....	5,505		68,501,041	
Tennessee .....	178		1,226,672	
Texas .....	14		20,360	
Utah .....	7		24,000	
Virginia .....	142		2,290,435	
Washington .....	10		56,000	
West Virginia .....	1,966		27,981,617	
Wyoming .....	98		1,468,994	
Total .....	13,254		174,012,293	

PRODUCTION OF COAL IN THE UNITED STATES FROM 1814 TO THE CLOSE OF 1910, IN  
SHORT TONS.

Year.	Pennsylvania anthracite.	Bituminous.	Total.	Year.	Pennsylvania anthracite.	Bituminous.	Total.
1814..	22 .....		22	1863..	11,785,320	9,533,742	21,319,062
1815..	50 .....		50	1864..	12,538,649	11,066,474	21,319,062
				1865..	11,891,746	11,900,427	23,792,173
1816..	75 .....		75				
1817..	100 .....		100	1866..	15,651,183	13,352,400	29,003,583
1818..	200 .....		200	1867..	16,002,109	14,722,313	30,724,422
1819..	350 .....		350	1868..	17,003,405	15,858,555	32,861,960
1820..	450 .....	3,000	3,450	1869..	17,083,134	15,821,226	32,904,360
				1870..	15,664,275	17,371,305	33,035,580
1821..	1,322 .....		1,322				
1822..	4,583 .....	54,000	58,583	1871..	10,342,057	27,543,023	46,885,080
1823..	8,563 .....	60,000	68,563	1872..	24,233,166	27,220,233	51,453,399
1824..	13,685 .....	67,040	80,725	1873..	26,152,837	31,449,643	57,602,480
1825..	42,988 .....	75,000	117,988	1874..	24,818,790	27,787,130	52,605,920
				1875..	22,485,766	29,862,354	52,348,320
1826..	59,194 .....	88,720	147,914				
1827..	78,151 .....	94,000	172,151	1876..	22,793,245	30,486,755	53,280,000
1828..	95,500 .....	100,408	195,908	1877..	25,660,316	34,841,444	60,501,760
1829..	138,086 .....	102,000	240,086	1878..	21,689,682	36,245,918	57,935,600
1830..	215,272 .....	104,800	320,072	1879..	30,207,793	37,898,006	68,105,799
				1880..	28,649,812	42,831,758	71,481,570
1831..	217,842 .....	120,100	337,942				
1832..	447,550 .....	146,500	594,050	1881..	31,920,018	53,961,012	85,881,030
1833..	600,907 .....	133,750	734,657	1882..	35,121,256	68,429,933	103,551,189
1834..	464,015 .....	136,500	600,515	1883..	38,456,845	77,250,680	115,707,525
1835..	690,854 .....	134,000	824,854	1884..	37,156,847	82,998,704	120,155,551
				1885..	38,335,974	72,824,321	111,160,295
1836..	842,832 .....	142,000	984,832				
1837..	1,071,151 .....	182,500	1,253,651	1886..	39,035,446	74,644,981	113,680,427
1838..	910,075 .....	445,452	1,355,527	1887..	42,088,197	88,562,314	130,650,511
1839..	1,008,322 .....	552,038	1,560,360	1888..	46,619,564	102,040,093	148,659,657
1840..	967,108 .....	1,102,931	2,070,039	1889..	45,546,970	95,682,543	141,229,513
				1890..	46,468,641	111,302,322	157,770,963
1841..	1,182,441 .....	1,108,700	2,291,141				
1842..	1,365,563 .....	1,244,494	2,610,057	1891..	50,665,431	117,901,238	168,566,669
1843..	1,556,753 .....	1,504,121	3,060,874	1892..	52,472,504	126,856,567	179,329,071
1844..	2,009,207 .....	1,672,045	3,681,252	1893..	53,967,543	128,385,231	182,352,774
1845..	2,480,032 .....	1,829,872	4,309,904	1894..	51,921,121	118,820,405	170,741,526
				1895..	57,999,337	135,118,193	193,117,530
1846..	2,887,815 .....	1,977,707	4,865,522				
1847..	3,551,005 .....	1,735,062	5,286,067	1896..	54,346,081	137,640,276	191,986,357
1848..	3,805,942 .....	1,968,032	5,773,974	1897..	52,611,680	147,617,519	200,229,199
1849..	3,995,334 .....	2,453,497	6,448,831	1898..	53,382,644	166,593,623	219,976,267
1850..	4,138,164 .....	2,880,017	7,018,181	1899..	60,418,005	193,323,187	253,741,192
				1900..	57,367,915	212,316,112	269,684,027
1851..	5,481,065 .....	3,253,460	8,734,525				
1852..	6,151,957 .....	3,664,707	9,816,664	1901..	67,471,667	225,828,149	293,299,816
1853..	6,400,426 .....	4,169,862	10,570,288	1902..	41,373,595	260,216,844	301,590,439
1854..	7,394,875 .....	4,582,227	11,977,102	1903..	74,607,068	282,749,348	357,356,416
1855..	8,141,754 .....	4,784,919	12,926,673	1904..	73,156,709	278,659,689	351,816,398
				1905..	77,659,850	315,062,785	392,722,635
1856..	8,534,779 .....	5,012,146	13,546,925				
1857..	8,186,567 .....	5,153,622	13,340,189	1906..	71,282,411	342,874,867	414,157,278
1858..	8,426,102 .....	5,548,376	13,974,478	1907..	85,604,312	394,759,112	480,363,424
1859..	9,619,771 .....	6,013,404	15,633,175	1908..	83,268,754	332,573,944	415,842,698
1860..	8,115,824 .....	6,494,200	14,610,042	1909..	81,070,359	379,744,257	460,814,616
				1910..	84,485,236	417,111,142	501,596,378
1861..	9,799,654 .....	6,688,358	16,488,012				
1862..	9,695,110 .....	7,790,725	17,485,835		2,180,334,670	6,063,016,589	8,243,351,259

The foregoing table shows the total production of anthracite in Pennsylvania since 1814, the total production of bituminous coal since 1820, and the total annual production to the close of 1910. During the period covered by this table the total production of anthracite in Pennsylvania has amounted to 2,180,334,670 short tons, that of bituminous coal to 6,063,016,589 short tons, and that of the whole country to 8,243,351,259 short tons. Of the grand total the anthracite mines of Pennsylvania have contributed a little more than 25 per cent., and a little less than 75 per cent. is represented by the production of bituminous coal.

The annual production of each State, from the time of earliest record to the close of 1910, is given in connection with the discussion of the production in the several States.

#### PRODUCTION BY CLASSES OF MINES.

In the following tables the production of coal in the United States in 1910 has been distributed according to the importance of the producing mines. The mines have been divided into five classes: First, mines producing 200,000 short tons or more during the year; second, mines producing from 100,000 to 200,000 short tons; third, mines producing between 50,000 and 100,000 short tons; fourth, mines producing between 10,000 and 50,000 tons; and fifth, mines producing less than 10,000 tons. In this compilation no account is taken of the small mines operated for purely local trade, nor of the anthracite recovered from old culm banks or river beds. Some producers in making their reports to the Survey combine the production of two or more mines on one schedule; in such cases the production of each mine has been assumed to be the average of all of the mines covered by the schedule.

The table shows that the production in the anthracite region of Pennsylvania is conducted in much greater proportion by large units than is done in the bituminous fields. There were 157 first-class mines in the anthracite region in 1910; they constituted 51 per cent. of the total number and yielded 82.5 per cent. of the total output. The bituminous mines of the first class made 10.6 per cent. of the total number

and they produced 46 per cent. of the total output. Eighty per cent. of the anthracite mines in both 1909 and 1910 were included among the first three classes; that is, mines producing more than 50,000 tons each, and this 80 per cent. of mines contributed 99 per cent. of the total production. In the bituminous mines there were 37.8 per cent. of the total number in 1909 and 40.2 per cent. in 1910 that produced over 50,000 tons, and these produced 87.4 per cent. of the total output in 1909 and 88.2 per cent. of the total in 1910.

Among the bituminous-producing States and Territories New Mexico leads in the proportion of tonnage by the larger units. Eighty-eight per cent. of New Mexico's total production in 1910 were from mines of the first class. Nine mines out of 31 in 1910 produced over 200,000 tons. Utah ranks second in the proportion of production by large units. Maryland was credited with the largest average output from mines of the first class, with 583,044 tons as the average for 4 such mines, while the production from 4 first-class mines in Montana averaged 476,812 tons each, and the average output from the 5 first-class mines in Utah was 403,876 tons. In 1910, 77 per cent. of Utah's production was from first-class mines and the average production was 387,350 short tons; 65.4 per cent. of Montana's production, 59.7 per cent. of Washington's, and 60.4 per cent. of Wyoming's were from mines of the first class.

Pennsylvania was the only State east of the Mississippi in which more than half of the production was from mines of the first class. West Virginia, the second State in coal-producing importance, presents a peculiar case in that only 23.5 per cent. of its total production in 1909 and 35.4 per cent. in 1910 was from mines of the first class, but 37 per cent. of its total production in 1909 and 30.6 per cent. in 1910 was from mines of the second class. The fourth and fifth class mines in 1910 represented 60 per cent. of the total number of mines and contributed a little over 10 per cent. of the total production.







The influence of the strike in Illinois in 1910 was shown by a decrease from 97 to 58 in the number of mines producing over 200,000 tons, and the percentage of the total output from these mines decreased from 60 per cent. to 44 per cent. The second-class mines in Illinois increased from 80 in 1909 to 102 in 1910, and the percentage of the total production from this class increased from 22.1 to 31.4 per cent. Kansas and Arkansas each had 3 first-class mines in 1909 and none in 1910; Missouri had 2 in 1909 and none in 1910; whereas Kentucky, which benefitted from the strike in the other states, showed an increase from 3 to 9 in the number of first-class mines and from 7 to 16 in the percentage of the product from such mines.

Mining is one of the two great basic industries, the other being agriculture. Coal is the principal mineral product and it is the product on which practically all lines of transportation and manufacture depend for existence. The value of the coal production, compared with that of any of the principal agricultural products, or with the total value of the products of agriculture, puts mining apparently in a bad second place. The value of the agricultural products in 1910 was more than four times the total value of the mineral output. The corn crop during the last three years has averaged in value over \$1,600,000,000, two and a half times the value of the coal output in 1910. The products of the barnyard, exclusive of the dairy products, exceed the combined value of all the metals, including gold, silver, iron, copper, lead, zinc, aluminum, quicksilver, etc. But it must be remembered that in the utilization of the products of agriculture and mining there are two essential differences—(1) that with the exception of a portion of the products of the forest used in building and in the industrial arts, all of the products of the farm, the garden, and the ranch are consumed in their utilization for the needs of man. The products of the mines and the quarries, on the other hand, with the exception of the fuels and some of the chemical products, such as salt, sulphur and phosphate rock, are not consumed in being applied to man's use, but become a part of the permanent wealth of communities. (2) The products of the soil are perennial, one

growth and harvest being succeeded by another, which will continue as long as the world and time last, but the contents of the mines are stored products, and once exhausted are never replenished.

According to the report of the Interstate Commerce Commission for the year ended June 30, 1910, the coal production of the United States furnishes the transportation companies one third of their total tonnage. The total originated tonnage of the freight traffic for the year mentioned was 968,464,000 tons, of which the coal mines contributed 324,335,000 tons.

The agricultural products furnish about 8 per cent. of the railroad tonnage.

I have shown that our stores of coal are vast, but they are by no means limitless. Many generations will come and go before our storehouses are exhausted, but we are drawing upon them at an enormous and constantly increasing rate, and they should receive the consideration of every one who is interested in the conservation of our mineral resources. Conservation should, however, be tempered by reason, and should not operate to the hoarding and non-use of our resources, but to their exploitation, development, and utilization with the greatest efficiency for our present needs and with the elimination of every unnecessary waste.